Comparisons of Sea Surface Temperature as derived from the European Remote Sensing Satellite (ERS-1) Along Track Scanning Radiometer (ATSR) and the NOAA/NASA AVHRR Oceans Pathfinder Project

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Comparisons were done between the NOAA/NASA AVHRR Oceans Pathfinder sea surface temperature (SST) data set and SST as derived from the Along-Track Scanning Radiometer (ATSR) on board the European Remote Sensing Satellite (ERS-1) (ASST). The two data sets provide a unique opportunity for comparing independent satellite derived SST retrievals between 1992 and 1996. In a preliminary step mean biases and standard deviations were calculated between the MPFSST and the co-located in-situ Pathfinder matchup database. Globally, the MPFSST was biased colder than the in-situ data by 0.14°C with a standard deviation of .07∞C. However these results were found to vary significantly between ocean basins. Mean biases and standard deviations of the difference maps of MPFSST - ASST were calculated. The loss of the 3.7 micron channel on board the ATSR-1 instrument had a larger effect on the nighttime differences and thus application of the model to remove residual cloud cover only had a significant impact on the nighttime mean bias and standard deviation. A mean bias of 1.40, with MPFSST warmer than ASST, and a standard deviation of 0.57, were calculated. To confirm that part of the differences between the MPFSST and the ASST was due to residual cloud cover a set of EOFs were extracted from the MPFSST-ASST difference maps before and after applying the cloud removal model to the ASST. A significant drop from 36% to 14% in the percent variance explained by the first mode indicates that applying the cloud removal algorithm has removed a significant signal from the difference maps. The mean bias for the summation of the first two EOFs is reduced from 0.59°C to 0.34°C and the standard deviation from 0.19°C to 0.16°C. Thus as a minimum 0.25°C of the signal in the difference maps is due to residual cloud cover in the ASST data. It is concluded that with improved cloud detection and atmospheric corrections being applied to the ASST, along with improvements to the MPFSST, achieving the required 0°C mean bias and standard deviation of < 0.1°C for global climate studies is not impossible.